

ABSTRACT

A cost-effective, scalable technique for producing microspheres loaded with biologically active solid proteins is provided. The microspheres degrade over time and release biologically active VEGF, as demonstrated by the proliferation of HUVECs *in vitro* compared to negative controls. A defined concentration of microspheres can deliver a quantifiable level of VEGF with known release kinetics. The invention can be used with other growth factors and applied to tissue engineering applications such as the regeneration of peripheral nerve, bone, adipose tissue, and solid organs. The method of the invention includes the steps of dissolving a polymer with an organic solvent to produce a polymer solution; adding a biologically effective amount of a bioactive substance to the solution to produce a mixture of the polymer and the bioactive substance; vibrating the mixture to produce a bioactive substance-polymer complex; emulsifying the mixture to produce an emulsion comprising the bioactive substance-polymer complex; and extracting the organic solvent from the emulsion to produce microspheres comprising the polymer-bioactive substance complex, wherein the bioactivity of the bioactive substance is usefully preserved.